Response to NJDEP comments provided in the October 25, 2002 letter addressed to Sharon Jaffess, Remedial Project Manager, USEPA

Response to NJDEP comments provided in the October 25, 2002 letter addressed to Sharon Jaffess, Remedial Project Manager, USEPA.

1. Section 1.2 PRSA Setting/History - Notably lacking in this section is any reference to the significant dioxin contamination in the Passaic River in comparison to other rivers which drain similarly developed lands (urban, industrial, commercial). Although many of the contaminants in the Passaic River are commonly found at elevated levels in rivers draining heavily industrialized areas, the Passaic River system is unique due to the significantly elevated levels of 2,3,7,8-TCDD (TEQ) in shallow and deep river sediments. The Passaic River Study was initiated because of documented dioxin impacts on river sediment, as reported in the March 1986 Passaic River Sediment Study, prepared by IT Corporation for the former Diamond Shamrock Chemicals Company (now Tierra Solutions, Inc.). For this reason, dioxins and dioxin-like PCBs head the hierarchical list (QAPP Table 4-3) for chemical characterization of collected samples from the CSOs.

Response to Comment

Acknowledged. A response to this comment is not necessary.

End of Response to Comment

2. Section 3.2.2 Usability of Information from Other Sources - a) With regard to analytical data from other sources (for example, PVSA (sic), CARP, etc.), even if these data were not collected in the precise manner as this CSO Work Plan, the USEPA and Department will assist in determining the usability of such data based on the merits of the sampling and analytical methods used, and the validation of the data. Even if such data are determined to not be directly comparable, this information may serve as valuable supporting documentation on conditions in the Passaic River system. b) With regard to the modeling discussion, actual site-related data should take precedence over general input parameters from SWM models.

Response to Comment

a. Acknowledged. A response to this comment is not necessary.
b. Acknowledged. A response to this comment is not necessary.

End of Response to Comment

3. Section 4.3 Field Sampling Logistics - It is noted that samples are to be collected upstream of the tide gates, when present, and downstream of the grit chamber, weir, or other flow-limiting structures. For each CSO sample event, a record of the particular CSO structure/features (tide gate or not, etc.) and stage of tide should be recorded for later use in assessing the analytical data.

Response to Comment

Tierra has already identified the structural characteristics of each CSO through a field reconnaissance program (see Section 2.2.1 CSO Field Reconnaissance and Section 4.3 Field Sampling Logistics of the May 2002 RI-CSO Work Plan/Field Sampling Plan [RI-CSO WP/FSP]). Tide stage information will be recorded during the various sampling events.

End of Response to Comment

4. Section 4.4 Bulk CSO Effluent Collection (SOP No. 3) - This section and SOP No. 3 should specify the desired volume for the bulk CSO effluent collection work, and its basis.

Response to Comment

A specific volume of bulk CSO effluent is not provided in SOP No. 3 as the selection of target analyses on whole water samples and solids/sediment samples cannot be specified until the initial evaluation phase has been completed.

Tierra estimates that it may be necessary to centrifuge approximately 1,000 gallons of bulk CSO effluent to provide sufficient solids/sediments mass to complete analysis of the entire suite of targeted analytes (including matrix spike/matrix spike duplicates [MS/MSDs]). This estimate is based on measured total suspended solids (TSS) concentrations (ranging from approximately 50 milligrams per liter [mg/L] to over 150 mg/L) obtained from CSO effluent samples collected by PVSC and Tierra at CSOs located throughout the Passaic River Study Area (PRSA).

Recognizing the challenges posed by the collection, storage, and processing of such a large volume of CSO effluent, Tierra has, since the May Work Plan submittal, completed an evaluation that sought to improve and simplify the solids/sediments management process proposed in the RI-CSO WP/FSP. The improvement consists of using direct centrifugation during collection of the bulk CSO effluent to reduce or eliminate the amount of bulk effluent needed to be containerized and transported for processing. A new SOP (No. 8, Collection of Solid Samples via Direct Centrifugation Methodology) has been developed and is attached to these responses for USEPA review and approval.

End of Response to Comment

5. Section 4.1, page 4.1: States that Tierra will determine which matrix is to be analyzed for a given class of compounds. The Department and/or USEPA should have final approval of such a decision.

Response to Comment

Acknowledged. In response to this comment, Table 5-1 (RI-CSO Investigation Estimate Schedule) from the Passaic River Study Area CSO Investigation, Volume 1, has been modified to reflect a milestone for Tierra to present the results of the evaluation phase to the USEPA. The revised Table 5-1 is attached.

End of Response to Comment

6. Section 4.2, page 4-2 - The initial evaluation phase (trial evaluation) and resulting conclusions will be based on only 1 sample collected at 1 CSO. This is insufficient to determine "representativeness" and usability of the sample data, and cannot provide any information regarding the accuracy and precision of the sample collection and analytical protocols. Blank contamination effects on sample data must also be considered when evaluating data usability. One sample cannot provide information regarding "representativeness." Accuracy and precision are not evaluated by "comparing the per cent usable data" obtained from a sample. More than one trial run CSO would be better.

Response to Comment

The objective of the proposed evaluation phase is to compare the analytical results obtained from solid versus liquid samples, and to select the medium (solid or liquid) that is more appropriate to provide useable concentrations/detections of constituents in the CSO bulk effluent. "Representativeness" for this application is defined in Section 3.3.3 of the May 2002 RI-CSO Quality Assurance Project Plan (RI-CSO QAPP).

The analytical results for each medium, along with associated QA/QC samples (e.g., field blank, MS/MSD), will be evaluated based on USEPA Region 2 data validation protocols, and other data validation procedures specified in the RI-CSO QAPP. The data validation process will include assessments of accuracy, precision, and representativeness of the analytical data produced using the sample collection and analytical protocols specified in the RI-CSO WP/FSP and QAPP. Data usability will be determined based on the outcome of the data validation processes described above, and the use of data qualifiers, as appropriate.

It is therefore Tierra's position that the initial evaluation phase will be sufficient to evaluate which matrix provides the more usable data to meet the project objectives.

End of Response to Comment

The following comment is provided with the understanding that CARP sampling methods may not be appropriate for the purposes of the Passaic River Study Area Superfund site. Nonetheless, I felt that it would be useful to provide the following information to your agency:

7. Table 4-3 - Based on these minimum dry weights of sample masses, different analytical procedures may be needed to obtain quality data. For the CARP POTW work, a sample volume of 2.5 L, with an average TSS of 30 mg/L, is used for each analytical group. This totals only about .075 g per analytical group. For the CARP ambient data, the objective is to collect 3-5 grams of sediment for all of the analytical groups. Combined with the analytical methods used in the CARP, these sediment masses consistently provide detectable and useable data for all analytes of concern, with minimum blank contamination effects. Collecting large amounts of sediment can actually lead to dilution and matrix interference effects, resulting in poorer quality data.

Response to Comment

Tierra performed a detailed evaluation of the CARP sampling and analytical procedures, and presented the findings to Mr. Richard Winfield of the USEPA in a letter dated December 7, 2001. Based on this evaluation, the CARP POTW analytical procedures are not adequate to meet the DQOs of this project, and cannot be used during Tierra's investigation program.

The commenter indicates that analytical methods used in the CARP "consistently provide detectable and useable data for all analytes of concern." It would be beneficial to both the USEPA and Tierra to receive copies of those data for review and consideration. As such, Tierra requests that the NJDEP provide the aforementioned data for review.

Tierra does not understand the basis for the statement "Collecting large amounts of sediment can actually lead to dilution and matrix interference effects, resulting in poorer quality data." There is no scientific reason to expect dilution or matrix interference impacts as a result of larger sediment volumes. If the reviewer can clarify these thoughts, Tierra can provide a more thorough response. The proposed sample collection program allows for the collection of the large quantities of suspended solids/sediments that are necessary to perform both the required analyses and the QA/QC analyses necessary to validate the results.

Table 4-3 was designed to show the hierarchy of analyses should sample volumes not meet the desired minima (these tables have been included as a field management "tool" for all Tierra sampling programs). As such, and to establish an unambiguous measure of the required sample mass, sample weights are quoted "dry," even though the samples will be collected and analyzed in their wet weight condition. This means that, assuming 50% moisture content (which is the post-centrifugation target), the minimum sample volumes planned for the laboratory(ies) will actually be approximately twice those shown in Table 4-3. Therefore, at an estimated average TSS of 100 mg/L (field-derived TSS values ranged from 50 mg/L to over 150 mg/L), approximately 1,000 gallons of bulk effluent are needed to deliver between 600 and 700 grams (g) of wet weight sediment to the laboratory(ies) for analysis. This sample mass is sufficient to perform full aliquot sample analyses with extra sample mass available for MS/MSD determinations. In addition to MS/MSDs, field blanks will be submitted to the laboratory for analysis along with the CSO samples collected. The quality control samples collected in conjunction with the CSO solids/sediments will be used to monitor potential contamination and matrix interferences.

End of Response to Comment

8. For several measures of quality assurance (described in Sections 3.4.3, 3.4.4, 3.4.6, 9.2.5) if analytical acceptance criteria are not met, the QAPP doesn't describe the type of corrective action to be taken. This information should be provided to the agencies prior to initiation of sample collection.

Response to Comment

The following text has been added to each of the sections identified above: "If analytical acceptance criteria for laboratory control samples are not met, the laboratory will be responsible for reprocessing all affected samples." Revised pages 3-38, 3-39, and 9-9 are attached.

End of Response to Comment

9. Section 7.2 – The laboratory certification information wasn't provided for the numerous candidate labs proposed for this project. New Jersey certified labs must be used for this project.

Response to Comment

Tierra can not identify any obligation under CERCLA, the NCP, or the recent USEPA Requirements for Quality Assurance Project Plans (QA/R5) to use state-certified laboratories. Further, there is no obligation under the Administrative Order on Consent (AOC) and the associated Statement of Work (SOW) to use New Jersey-certified laboratories. The AOC only requires that laboratories subscribe to USEPA Quality Assurance procedures. Tierra will meet its obligation to provide information pertaining to laboratory certification to the USEPA for review and approval prior to initiating field sampling activities, as indicated in Section 7.2 of the RI-CSO QAPP.

End of Response to Comment

10. Section 8.1 – The deliverables are not complete enough for validation by the Department. Since this is an EPA lead project, for which validation will be performed by EPA, this issue is deferred to EPA.

Response to Comment

Acknowledged. A response to this comment is not necessary.

End of Response to Comment

11. Section 13.2 – If corrective action requires modification of the QAPP, the Department should also be notified for informational purposes.

Response to Comment

Acknowledged. A response to this comment is not necessary.

End of Response to Comment

Response to PVSC comments provided in the October 24, 2002 letter addressed to Rick Winfield, Remedial Project Manager, USEPA

<u>Response to PVSC comments provided in the October 24, 2002 letter addressed to Rick Winfield, Remedial Project Manager, USEPA.</u>

1. Section 3 on page 3-1 states that: "The purpose of the RI-CSO Investigation is to evaluate the annual mass of contaminants released into the PRSA from ongoing CSO discharges through the collection of site-specific data and information. The resulting calculation of annual mass loading of contaminants released into the PRSA will primarily be used in the development of the PRSA HERA and FS."

   Comment: It appears that the emphasis of the program has switched from an evaluation of the dioxin contamination from the Diamond Shamrock site to an evaluation of the impacts of CSO discharges on the sediments of the PRSA. CLH was going to implement an Ecological Sampling Plan that not only included investigations into CSOs but also surface sediment sampling, sediment toxicity testing, caged bivalve investigations, biological tissue-residue sampling and ecological habitat and community surveys. Have the other tasks as outline (sic) for the original program been completed, and if so, what were the results.

Response to Comment

The intent of this investigation, which represents a component of the Ecological Sampling Plan (ESP), continues to remain the same: to provide additional data necessary to complete the Human Heath and Ecological Risk Assessment (HERA) for the PRSA. The USEPA identified the need for the ESP (including the RI-CSO investigation) after its review of the Draft Screening-Level HERA for the PRSA (submitted to the USEPA on July 6, 1995) indicated that insufficient information existed to complete the HERA.

Six of the seven tasks included in the ESP are complete, and Tierra has submitted the results to the USEPA for review. The only exception is the RI-CSO investigation, for which Tierra is currently seeking approval. Tasks completed to date include:

- surface sediment sampling,
- sediment toxicity testing,
- caged bivalve investigations,
- biological tissue-residue sampling,
- ecological habitat and community surveys, and
- creel/angler survey

The results of these tasks are presented in reports submitted to the USEPA and may be reviewed at the USEPA public document repository.

End of Response to Comment

2. Section 3.2, page 3-3, 1st paragraph states that: "Representative chemical concentrations in CSO effluent will be calculated using one of the several possible methods, depending on the nature of the data that was ultimately obtained. For any un-sampled, yet operable CSOs, the associated chemical concentrations for the aqueous fraction and/or solids fraction will be estimated from the measurements obtained at other CSOs that discharge into the PRSA. **To the extent practical**, the estimated concentrations will be derived from CSOs that are similar in source composition (industrial vs. residential), nature of the source (types of industry), size of drainage area, and other relevant characteristics.

   Comment: It is unknown what the phase (sic) "To the extent practical..." means in the context of this study. The use of data from one drainage basin to another should only be used when the two drainage areas have very similar characteristics in terms of land use, and the nature of the contamination sources (industry), otherwise the study could be biased by sampling in heavily industrial areas and using the data in other areas of dissimilar characteristics. Tierra Solutions should provide detailed information on the land use characteristics of each drainage basin, including industrial users, and establish in the Work Plan what drainage basins will be sampled and where the data will be used as an estimate in other drainage basins. Only in this matter can there be some assurance that the data will be used in drainage basins of very similar characteristics.

Response to Comment

It is not Tierra's intent to bias the RI-CSO investigation by sampling in heavily industrialized areas and using the data in other areas with dissimilar characteristics. The intent of Section 3.2 is to describe a procedure for estimating mass loading concentrations in drainage basins where no data are available by using data from CSOs with similar relevant characteristics. If the criteria for determining similarity (described in Section 3.2) cannot be met for certain drainage basins, then estimated mass loading concentrations may not be available for those CSOs.

Since the submittal of the RI-CSO WP/FSP, Tierra has had the opportunity to review PVSC's detailed information on land use characteristics of each drainage basin within the PVSC district located along the PRSA (Towns of Harrison and Kearny, and the Borough of East Newark). Tierra is currently waiting to obtain similar information for drainage basins located in the City of Newark.

Tierra has proposed to perform the investigation in phases starting with 10 CSOs, as presented in the June 2000 Memorandum presented in Appendix 1 of the RI-CSO WP/FSP. As discussed during the February 6, 2001 meeting held at the USEPA facility in Edison, New Jersey, Tierra will work with the PVSC to finalize the list of CSOs targeted for sampling based on drainage basin characteristics, site access, safety, and other logistical sampling matters. Tierra welcomes PVSC's input on such matters, and is prepared to meet with the USEPA and PVSC as soon as possible.

End of Response to Comment

3. Section 3.2, page 3-3, 2nd paragraph states that: "The total suspended solids (TSS) concentration (mg Particulate/L effluent) will be measured in the effluent of each CSO that is sampled. For any unsampled, yet operable CSO, TSS will be estimated from data collected at other CSO…"

   Comment: See comment number 2. In addition, the concentration of pollutants discharged from CSO systems are a function of several factors including the number of days since the last rainfall, the characteristics of the rainfall event, and when during the overflow event the sample is collected. The sampling procedure (SOP NO. 3) should be more specific as to where the sampling hose will be located within the flow stream, and the pumping rate that will be used to collect the bulk sample. A high pumping rate at the start of the storm during the first flush could produce erroneous information on the total TSS discharged during the storm event since TSS concentrations normally peak at the start of the storm and decrease as the storm progresses.

Response to Comment

See response to Comment 2.

Tierra recognizes that TSS and other constituents carried in CSO systems are a function of several factors, including storm characteristics and the time and duration of sampling. To address these issues, Tierra plans to collect CSO samples during each of the two types of storms defined in the USEPA guidance for "dry" vs. "wet" weather (USEPA, 1985). In addition, the sampling will occur at the onset of significant flow into the CSO pipe, and will continue until sufficient sample volume is collected.

Pumping rates will remain constant during sampling, but are anticipated to vary from one CSO to the next based on anticipated duration of overflow. Pumping rates are anticipated to range from 6 to 10 gallons per minute. Pump intake locations will be selected in areas where turbulent flow occurs, to ensure complete mixing of the effluent. The pump location and sampling flow rate will be selected on a CSO-specific basis pending approval of the RI-CSO WP/FSP.

End of Response to Comment

4. Section 3.2, page 3-3, 3rd paragraph describes in general how overflow volumes will be obtained.

   Comment: More specific information needs to be provided on the method to be used to determine effluent volumes. In addition, information on the type (make and model) of metering equipment used at each monitoring station and how it will be installed in the chamber, including the position of the velocity/depth probes, sensors, etc. needs to be provided.

It is unclear as to how the "Total annual volume for dry- and wet-weather overflows" will be established. Typically this is established based on a calibrated and verified SWMM 4 model and using average year rainfall patterns. CLH should provide more specific information as to the method that will be used. One problem with using any modeling method is that the model may not take into account the tidal elevations at each site during a rainfall event. Experience has indicated that high tidal elevations during rainfall events can significantly reduce the overall volume of the discharge.

Response to Comment

Currently, Tierra intends to use the SWMM model setup provided by PVSC, or equivalent, if necessary, to establish effluent volumes. The model will be calibrated based on measured rain and flow monitoring data collected during the CSO investigation, and will be developed in a manner that accounts for tidal effects based on tide monitoring data obtained during the sampling program, where appropriate.

Tierra will obtain flow measurements using Sigma 950 meters, or equivalent, equipped with depth sensors, bubblers, or ultrasonic Doppler transducer probes. The final location and position of the probes will be selected based on the physical characteristics of each CSO, manufacturer recommendations, and standard industry practices.

End of Response to Comment

5. Section 3.2.1, page 3-4, 3rd paragraph states: "PVSC is currently required to use the model as part of their permitting process. Therefore, it is anticipated that discharge volumes will be obtained from PVSC. If it becomes necessary to estimate discharge volumes using a model, the SWMM or similar methods will be used."

   Comment: The PVSC is not required to use SWMM as part of their permitting process. CLH should be more specific as to which models will be used to generate information on how there (sic) are going to estimate discharge volumes.

Response to Comment

Tierra's understanding is that the PVSC is currently developing a model of the CSO system using XP-SWMM to satisfy the CSO Long-Term Control Plan requirement of the PVSC general NJPDES Permit. It is Tierra's intent to use the PVSC SWMM4 model to estimate discharge volumes.

End of Response to Comment

6. Section 4.3, page 4-3, 1st paragraph states: "Preferred manholes used to access CSO effluent will be located upstream of the tide gates (when present) and downstream of the weir, grit chamber, or other flow limiting structures associated with the main trunk line of the CSO network."

   Comment: Tierra Solutions should redefine their "Preferred manholes" since the setup of PVSC CSO control facilities do not fit the description above. A typical control facility will have the overflow weir several feet upstream of the tide gate, and the grit chamber immediately upstream of the overflow weir. Accordingly there can be no manholes upstream of the tide gate, yet downstream of the grit chamber and overflow weir.

Response to Comment

Tierra performed a field reconnaissance of each CSO discharging into the PRSA with the assistance of the PVSC and is aware that CSO configurations vary. Selection of the "preferred manholes" will be made on a case-by-case basis (pending approval of the RI-CSO WP/FSP) in cooperation with the PVSC to adequately address site access, safety, and other logistical sampling matters.

End of Response Comment

7. Section 4.3, page 4-3, 2nd paragraph indicates that monitoring equipment will be used to collect precipitation data concurrently with overflow data. In addition it is indicated that tidal information associated with the overflow will be obtained from government sources.

   Comment: Additional information should be provided on the number of rainfall monitoring stations that will be established as well as the type of equipment, the frequency of data recording, and the locations of the rainfall stations. Several rain gage locations will be needed due to the size of the study area.

   The use of government tidal information will be inadequate for this project. Experience has shown that tidal impacts can severely limit the volume of the overflow actually discharged into the system and that accurate local readings are necessary. Accordingly, a minimum of two local tide gate stations, one on each end of the study area, should be established and used in the analysis.

Response to Comment

Final determination on the number and location of rain gauges to be used during the RI-CSO investigation will be made pending the selection of CSOs and drainage basins targeted for monitoring. Tierra will use a sufficient number of rainfall monitoring gauges to obtain an acceptable density of rainfall data for the study area.

Tierra intends to obtain rainfall measurements in 0.01-inch increments, with a maximum of 10-minute-interval logging capacity. The gauges will be placed in open locations that are free from outside influence, as per manufacturer specifications. In addition, Tierra will obtain available data from the NOAA gauges at Newark Airport and Little Falls, NJ.

Tierra agrees that accurate local tide readings are necessary and intends to install two tide gauges in the PRSA to continuously monitor local tide elevations during the CSO sampling program. One gauge will be placed in the upper 3 miles of the PRSA, and the other in the lower 3 miles. The exact locations will be determined based on a review of potentially suitable sites for gauge installation in these areas. Tierra will use these site specific data in place of the government tidal information.

Tierra developed a new SOP for the use of tide gauges in the CSO Program. SOP No. 9 - Tide Gauge Installation and Maintenance is attached for USEPA review and approval.

End of Response to Comment

8. Appendix 1, Summary of CSO Trial Run Program.

8a. Comment: In the description of the bulk sampling on page 3 of 7 there is no indication that the bulk sample was maintained at 4°C as required under normal preservation techniques. Tierra Solutions has not indicated what, if any, preservation techniques was (sic) implemented.

Response to Comment

While the preservation of aqueous samples and sediments/solids samples is required, CSO bulk effluent water is not considered an environmental sample; therefore, preservation is not necessary. Procedures for the preservation of aqueous and sediment/solids samples are provided in the RI-CSO WP/FSP and QAPP.

End of Response to Comment

8b. Comment: Page 5 of 7 of the program indicates the (sic) Worthington Avenue in Harrison will be one of locations wherein (sic) initially sampling will be conducted. Our experience indicates that there is a collapse or restriction in the outfall pipe at Worthington Avenue. The system surcharges under normal rainfall conditions and thus it appear (sic) that flow backups (sic) into the CSO Control Facility. Accordingly, it is anticipated that the data obtained at this location will be unreliable.

Response to Comment

Tierra will use this information accordingly in the final design of the program and welcomes similar additional input from PVSC.

End of Response to Comment

8c. Comment: In Figure 2 "Saybrook Place CSO Equipment Layout. (sic) The schematic indicates that the velocity probe will be located in the transition area of the chamber between the stop log and the tide gate. This is in an unacceptable location for any flow measurement for a number of reasons including:

- Area – Velocity meters/probes should be located in an area of near laminar flow. The location behind the weir will be an area of turbulent flow and therefore prone to inconsistent and inaccurate velocities readings.
- The sediment traps located around the flow will interfere with the flow pattern and therefore create inconsistent velocities in the area of the probe.
- The probe is located in the transition area and therefore it will be impossible to accurately determine the area of flow to be used in the flow determination. The velocity probe needs to be in area of consistent cross-section.

Response to Comment

Figure 2 is a schematic only and does not provide an accurate representation of field conditions. See response to Comment 4 regarding location and installation of flow measuring probes.

End of Response to Comment

6. [*Should be comment number 9.*] Appendix 4, SOP No. 2, Section 3.0 Sample Containers and Preservation

Comment: There is no indication as to how the bulk sample will be maintained at 4°C following sample collection.

Response to Comment

See response to Comment 8a.

End of Response to Comment

7. [*Should be comment number 10.*] Appendix 5, SOP No. 3, Section 6, page 5 of 9 states: "Based upon the current knowledge of the CSO system (obtained via the CSO Trial-Run

Program, the following procedures will implemented, **as practicable**, for collecting bulk CSO effluent..."

Comment: What is meant by "as practicable"? Normally procedures are implement as approved and any variation is documented. If necessary, standard procedures should be established for each site with modifications as may be necessary for implementation. The phase (sic) "as practicable" provides latitude that is normally not given to assure consistent sampling procedures and data.

Response to Comment

This phrase is intended to recognize the fact that conditions encountered in the field often necessitate changes to a work plan. Variations to proposed sampling procedures will be documented as required by the USEPA.

End of Response to Comment

8. [*Should be comment number 11.*] General Comments:

Comment 8 a) The Work Plan is not specific enough as the equipment, location, and procedures that will be followed to obtain flow and rainfall data, including how overflow volumes are to be obtained and where and how monitoring equipment will be utilized. Accurate rainfall data will require suitable equipment located in an area free from interference from buildings or trees. Accurate flow determinations will require careful selection of monitoring locations within the chamber to assure that suitable flow conditions are available. In the one known instance where the position of the velocity probe is indicated (Saybrook – Figure 2) the location of the probe is inappropriate and will lead to inaccurate flow determinations.

Response to Comment

See responses to comments 4, 7, and 8c (pages 4 of 10, 5 of 10, and 7 of 10, respectively).

End of Response to Comment

Comment 8 b) The Work Plan is not specific enough on the pump rates to be collected and the location of the pumps for bulk samples. What safe guards are going to be implemented to assure that the submersible pumps will not be picking up settled solids from the bottom of the diversion chamber or other sources??

Response to Comment

See response to comment 3.

The following text will be added to SOP 3 and has been incorporated into the new SOP 8: *"The pump intake will be placed 1 to 2 inches above the bottom of the chamber in an area of turbulent flow (where complete mixing occurs) to allow the collection of representative samples."* SOPs 3 and 8 are attached for review.

End of Response to Comment

> **Comment 8 c)** Normally, samples are iced immediately upon sample collection. It is anticipated that the procedures established for transport and suspended solids collection by centrifugation will take hours to complete. The Work Plan does not address how, or if, the samples will be preserved during the process.

Response to Comment:

Throughout the duration of this process, suspended solids samples collected via centrifugation will be placed on ice once retrieved from the centrifuge bowl. At the completion of this process, the solids will be composited.

Tierra has recently completed an evaluation of an improvement to the bulk sample collection method proposed in the RI-CSO WP/FSP. The improvement consists of using direct centrifugation during the collection of the bulk CSO effluent to reduce or eliminate the amount of bulk effluent needed to be containerized and transported for processing. SOP No. 8 – Collection of Solids Samples via Direct Centrifugation Methodology is attached for USEPA review and approval

End of Response to Comment

> **Comment 8 d)** We continue to have technical difficulties with the sediment trap procedure. Please reference comments previous (sic) provided on this matter.

Response to Comment

In-line sediment trap sampling is not currently considered for use in the RI-CSO WP/FSP. The CSO In-Line Sediment Trap Sampling Methodology was originally provided in the RI-ESP (1999) for the collection of CSO solids/sediments samples and was evaluated during the CSO Trial Run Program. This method has been retained in the RI-CSO WP/FSP only in the event that it may prove to be useful when sampling selected CSOs in the future.

End of Response to Comment

Response to GLEC comments provided as an attachment to the October 24, 2002 comment letter from the PVSC addressed to Rick Winfield, Remedial Project Manager, USEPA

Response to GLEC comments provided as an attachment to the October 24, 2002 comment letter from the PVSC addressed to Rick Winfield, Remedial Project Manager, USEPA.

The Great Lakes Environmental Center provided comments on six recommendations presented by the PVSC and indicated that Tierra addressed the PVSC comments in the revised RI-CSO WP/FSP, with one exception. This comment, and Tierra's response, is provided below.

PVSC's Recommendation:

Suspended solids data, as well as the volume filtered, should be provided for the bulk sample, so that comparisons can be made between the filtered and non-filtered samples.

Comment, Part A: This PVSC recommendation has been adopted. CHL (sic) (Tierra Solution) plans only to determine TSS on an aqueous sample from the bulk solution. The standard EPA method for TSS will be employed (1μm filtration over a glass fiber filter). CHL (sic) will use the TSS value in conjunction with the concentration of contaminant-of-interest found in the centrifuged bulk sample solids to derive the loadings of pollutant from the sediment. The assumption made by CLH is that the 1Φ filtered solids are equivalent (contain the same concentrations of contaminants, as the centrifuged solids). However, this assumption has not been demonstrated to be true. The possibility exists that the two different operational procedures do not produce identical products and if the pollutant concentration in the bulk solids is greater than that in the TSS solids, a positive bias (unrealistically high pollutant loading) will result.

Response to Comment

The "bulk solids" as referred to in the above comment consist of TSS settled out of CSO effluent via centrifugation. Chemical mass loading calculations derived from solids/sediment (not aqueous) samples will be calculated using TSS concentrations measured from CSO effluent samples (milligrams [mg] of TSS per liter of effluent), and concentrations of constituents detected on TSS settled out of CSO effluent solution via centrifugation (mg of constituents per gram of TSS settled out of solution). In this manner, it will be possible to calculate the concentration of constituents per liter of CSO effluent. The critical assumption in using TSS measurements for this purpose is that the TSS concentrations measured in discrete samples of effluent are representative of the CSO effluent.

In order to optimize the representativeness of TSS concentrations, multiple aliquots of CSO effluent will be collected for TSS measurements at specified intervals during the sampling. Centrifuging large volumes of CSO effluent to collect TSS for chemical analysis will, in effect, composite the solids to optimize representativeness of the analytical data.

End of Response to Comment

Comment, Part B: The validity of the CLH assumption could have been shown in the first trial run; however, the water samples were collected on different days from the bulk sediment samples, and filtration, not centrifugation was used to collect the solids. Also, TSS results from the first trial run are not reported in the summary report.

Response to Comment

The initial Trial Run Program included the collection of sediment samples via filtration, and the collection of filtered and non-filtered aqueous samples for analyses. One of the conclusions drawn from the initial trial run was that a better method of sampling CSO effluent was needed to enable applying USEPA-approved analytical methods to generate usable data. Collection of sediments via centrifugation was therefore subsequently evaluated to improve the RI-CSO Investigation program. This is why centrifugation was not evaluated as part of the first trial run.

TSS concentration obtained from the Trial Run Program is reported to be approximately 100 mg/L in the memorandum dated May 30, 2000, prepared by BBL, presenting the results of the Centrifuge Demonstration.

End of Response to Comment

Comment, Part C: A demonstration of the chemical equivalency of the centrifuged bulk solids and filtered TSS solids is needed. The demonstration could be incorporated into the initial evaluation phase of the study to allow for resolution of this issue.

Response to Comment

Subsequent to the Trial Run Program and the Centrifuge Demonstration project, Mr. Winfield of the USEPA expressed a similar concern over the use of centrifugation. Tierra evaluated the use of centrifugation to collect sediments from wastewater/surface water in response to this concern and presented the findings to the USEPA in a letter dated December 27, 2001. The following is a summary of the significant findings provided in the letter:

- Centrifugation provides the only practical method of collecting suspended solids from large-volume aqueous samples (it is not practical to filter a large volume of effluent and then composite the filtered solids).
- Centrifugation is widely accepted in collecting such samples and evaluating suspended solid chemical loading.

Based on Tierra's assessment of peer-reviewed literature on environmental applications of centrifugation, the proposed approach is the best available method to obtain large quantities of settleable solids from CSO effluents for chemical analysis.

End of Response to Comment

Revised Table 5-1

Table 5-1 RI-CSO Investigation Estimated Schedule

Task No.	Task	Task Estimated Duration (weeks)	Cumulative Estimated Duration (months)
1	Submittal of Draft RI-CSO Investigation WP/FSP/QAPP to USEPA	--	0
2	USEPA Review/Comment Period	4	1
3	Tierra Review/Comment Period	3	1.75
4	USEPA Review/Approval of RI-CSO Investigation WP/FSP/QAPP	3	2.5
5	Pre-Mobilization Activities	2	3
6	Equipment Acquisition/Construction/Testing	8	5
7a	Evaluation Phase (sampling/analysis/selection of final program)	9	7.25
7b	Presentation of Results and Concurrence on Selected Methods/Matrices	3	8
8	Final RI-CSO Sampling	52	20
9	Data Validation/Report Preparation	12	23

Assumptions

Task/program durations are based on the following assumptions:

1. Access to CSOs will be readily obtained and will not delay implementation of the program.
2. PVSC manual overflow bypass procedures will be made available for review and will remain consistent with historical practices during the implementation of the RI-CSO Investigation.
3. Precipitation frequency and intensity during the RI-CSO Investigation will be consistent with historical averages.
4. Sample collection success rate estimated at approximately 50%.

Revised Pages 3-38, 3-39, and 9-9

3.4.3 Aroclor PCBs

The limits for MS/MSD accuracy and precision for specific aroclor analytes in aqueous and solid (effluent) matrices, are laboratory-specific and will be developed following the procedures listed in Section 8.0 of analytical method (Method 8000B in Appendix A). Likewise, surrogate %R (recovery) limits must be developed following the procedures outlined in Section 8.0 of Method 8000B. However, laboratory in-house acceptance limits for surrogate recovery must not exceed 30 - 150 percent. Per Method 8082 limits for accuracy (%R) for the LCS are 70% – 130% for aqueous and solid (effluent) matrices. If analytical acceptance criteria for laboratory control samples are not met, the laboratory will be responsible for reprocessing all affected samples.

3.4.4 PCB Congeners and Homologues

The limits for MS/MSD accuracy (%R) for PCB congeners in aqueous and solid (effluent) matrices are 60 - 140% (valid only when the spike level is between 25 – 400% of the reported sample concentration). The acceptance limit for MS/MSD precision (%RPD) is ±50 percent. Internal standards will be added to each sample prior to sample preparation. Internal standard recoveries must be between 25 - 150 percent. Finally, the method required Ongoing Precision and Recovery (OPR) standard must have observed final concentrations for each target analyte within the acceptance ranges listed on Table 6 of the analytical method (Appendix D). If analytical acceptance criteria for laboratory control samples are not met, the laboratory will be responsible for reprocessing all affected samples.

3.4.5 Chlorinated Herbicides

The limits for MS/MSD accuracy and precision for chlorinated herbicides for aqueous and solid (effluent matrices are laboratory specific and will be developed following the procedures outlined in Method 8000B) making appropriate adjustments for matrix. Limits for accuracy of surrogate recoveries are calculated by the laboratory from historic data as specified in Method 8000B. However, laboratory derived in-house acceptance limits for surrogate and matrix spike recoveries must not exceed the percent recovery ranges listed below.

QC Check Standard	Acceptance Range
Surrogate	50 - 120%
Matrix Spike	60 - 140%

Per Method 8151A limits for accuracy (%R) for the LCS are 70 - 130%.

3.4.6 PCDD/PCDFs

The limits for MS accuracy for PCDDs/PCDFs analyses in aqueous and solid (effluent) matrices are 60 – 140%. Labeled analog standards added to each sample prior to preparation for analyses must have calculated percent recoveries within the acceptance range (25 - 150%). Finally, acceptance limits for the initial precision and accuracy standard (IPR), the ongoing precision and accuracy standard (OPR), and the calibration verification standards (VER) must fall within the acceptance ranges provided on Table 6 of Method 1613B. If analytical acceptance criteria for laboratory control samples are not met, the laboratory will be responsible for reprocessing all affected samples.

3.4.7 Cyanide

The limits for MS and LCS accuracy (%R) for Cyanide for both aqueous and solid (efflluent) matrices should be laboratory specific and are developed according to USEPA SW846 procedures. Likewise, analytical duplicate precision (RPD) acceptance limits are laboratory specific and are developed according to USEPA SW846 procedures. However, laboratory in-house acceptance limits must not exceed the percent recovery ranges and/or RPD's listed below by QC category.

However, MS/MSD or MS/Duplicate analyses must be performed at the method specified frequency. The analytical laboratory must perform MS/MSD or MS/DUPLICATE analyses where appropriate at a minimum frequency of one for each analytical batch of samples. A batch is defined as a group of up to twenty samples, of the same matrix, prepared at the same time, using the same procedure.

Additional sample volume will be required to perform the MS/MSD analyses for the sediment samples. Triple sample volume will be collected and forwarded to the laboratory for the MS/MSD analysis of aqueous extractable organic samples, which include the semivolatile organics, pesticides, HRGC/LRMS/SIM PAHs aroclor PCBs, chlorinated herbicides, PCB congeners and homologues, organotins, and PCDD/PCDFs.

9.2.5 Laboratory Control Sample

A clean laboratory matrix, which is spiked with a known amount of a standard (or standards) is defined as a LCS. The LCS results provide an indication of the accuracy of the laboratory's analysis on standard materials. The analytical laboratory must perform a LCS analysis representing each target analyte group at a minimum frequency of one for every analytical batch of samples. A batch is defined as a group of up to twenty samples, of the same matrix, prepared at the same time, using the same procedure. If analytical acceptance criteria for laboratory control samples are not met, the laboratory will be responsible for reprocessing all affected samples.

9.2.6 Performance Evaluation (PE) Sample

A clean sample matrix which is spiked with a known amount of one or more target compounds and submitted blind to the laboratory to evaluate the accuracy of the laboratory's analysis is defined as a PE sample. For the analysis of PCDD/PCDFs, EPA may supply PE sediment samples fortified with the tetra- through octa-chlorodioxins and furans. If the PE sediment sample is unavailable from EPA, the laboratory will substitute the method required Ongoing

Revised SOP No. 3 – Bulk Combined Sewer Overflow Effluent Collection Methodology

PASSAIC RIVER STUDY AREA
REMEDIAL INVESTIGATION -
COMBINED SEWER OVERFLOW INVESTIGATION
WORK PLAN/FIELD SAMPLING PLAN

STANDARD OPERATING PROCEDURE NO. 3

BULK COMBINED SEWER OVERFLOW EFFLUENT COLLECTION METHODOLOGY

FEBRUARY 2003

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1.0 APPLICABILITY

This Standard Operating Procedure (SOP) defines the methodology to be followed for the collection of bulk effluent from Combined Sewer Overflows (CSOs) within the Passaic River Study Area (PRSA). These bulk collection procedures give descriptions of equipment and field procedures necessary to collect bulk CSO effluent in this manner. SOP No. 4 (Suspended Solids Sampling Methodology) and SOP No. 5 (Aqueous Sampling Methodology) provide detailed protocols for the collection, preparation, and handling of samples obtained from the bulk CSO effluent.

Other SOPs that will be utilized within this procedure include:

- SOP No. 1 – Decontamination;
- SOP No. 4 – Suspended Solids Sampling Methodology; and
- SOP No. 5 – Aqueous Sampling Methodology.

2.0 PREPARATION FOR SAMPLING

The RI-CSO WP/FSP (Volume 1) identifies the process for the selection of CSO sampling stations, the frequency of sampling, sample type, and field measurements for this study element. Analytical procedures are discussed in the Remedial Investigation-Combined Sewer Overflow (RI-CSO) Quality Assurance Project Plan (QAPP) (Volumes 2 and 3). The field team is responsible for reviewing the RI-CSO Work Plan/Field Sampling Plan (WP/FSP) (Volume 1) prior to conducting field activities and ensuring that all field equipment, including sample containers and preservatives, are available and in acceptable condition.

3.0 FIELD EQUIPMENT LIST

Equipment to be used during the collection of CSO bulk effluent may include, but is not limited to, the following:

- flow meter with electronic depth and velocity sensor, temperature/pH meter, and dissolved oxygen/conductivity/salinity meter;
- modem system for remote monitoring;
- backup temperature/pH meter and dissolved oxygen/conductivity/salinity meter;
- field monitoring equipment (OVA or HNu and CGI/O_2 meter);
- peristaltic pump and tubing;
- trailer/semi-automated sampling unit;
- electronic controls for sampling unit;
- trailer-mounted bulk water storage tank(s);
- electric generator;
- traffic control equipment; and
- automated precipitation gauge.

All field instrumentation and equipment will be calibrated and maintained in accordance with manufacturer specifications.

4.0 DECONTAMINATION OF EQUIPMENT

Decontamination of CSO sampling equipment will be performed prior to the initial set up and between each sampling event at each location in accordance with procedures outlined in SOP No. 1 - Decontamination. Personnel decontamination procedures are contained in the Health and Safety Plan (HASP).

5.0 LOCATION OF SAMPLING STATIONS

5.1 CSO LOCATIONS

The RI-CSO WP/FSP (Volume 1) describes the locations of the CSOs within the PRSA targeted for sampling. Once on location, the manhole accessed to collect CSO effluent samples will be established and labeled on a map.

5.2 PRECIPITATION/TIDE MONITORING

Automated monitoring equipment will be used to obtain precipitation data and tide elevation throughout the sampling program. Sufficient precipitation monitoring gauges will be used to obtain an acceptable density of precipitation data for the study area. Precipitation information from government sources will also be obtained during the entire sampling program. In addition, two tide gauges will be placed within the PRSA. One gauge will be placed in the upper 3 miles of the PRSA, and another placed in the lower 3 miles. These tide gauges will be installed and maintained in accordance with SOP No. 9 – Tide Gauge Installation and Maintenance.

All field instrumentation and equipment will be calibrated and maintained in accordance with manufacturer specifications.

6.0 BULK EFFLUENT COLLECTION

Based upon the current knowledge of the CSO system (obtained via the CSO Trial-Run Program [CLH, 2000a]), the following procedures will be implemented, as practicable, for collecting bulk CSO effluent from operable and accessible CSOs that discharge into the PRSA. It is anticipated that bulk effluent will be obtained from CSOs utilizing a semi-automated collection methodology (Section 6.1). Manual bulk effluent collection procedures

(Section 6.2) will be used as an alternate effluent collection methodology should the semi-automated procedures prove infeasible at a particular CSO.

6.1 SEMI-AUTOMATED BULK EFFLUENT COLLECTION PROCEDURES

The semi-automated collection procedures will utilize a mobile sampling unit for the collection of bulk CSO effluent. This unit will utilize a heavy-duty enclosed trailer as a secure platform for mounting/housing the sampling equipment/controls. Within the enclosed trailer, electronic controls, storage tank(s), pump(s), and appropriate tubing will be mounted/installed. A modem system may also be installed for remote notification of the overflow event. The sampling unit power source will be located outside the enclosed trailer in a secured compartment.

At locations where traffic conditions hinder the positioning of the trailer directly adjacent to the manhole, attempts to install underground piping from an adjacent parking location to the manhole will be undertaken. As appropriate, all necessary permits will be obtained from the local police, transportation, and sewerage/sanitation departments prior to sampling, accessing CSO manholes, or installing underground piping.

Traffic control may be needed to facilitate collection of the bulk effluent. If the CSO location is heavily trafficked, a traffic control crew may be necessary. A local contractor experienced in traffic control may be retained to perform traffic control in accordance with New Jersey Department of Transportation regulations. The contractor would prepare a traffic control plan outlining notification procedures, crew training, and traffic control measures to be used in this work. Passaic Valley Sewerage Commissioners (PVSC) traffic control protocols will be reviewed and incorporated, as appropriate.

At locations where traffic conditions/parking are not of concern, the sampling trailer will be placed directly adjacent to the manhole accessing the CSO. The following protocols will be implemented at CSOs where traffic/parking is not an issue:

1. Properly decontaminate all sampling equipment to be used under this protocol, in accordance with SOP No. 1 – Decontamination.

2. Pre-install flow meter(s) with velocity/depth sensor(s) at an appropriate location(s) within the CSO. (Sensors will be programmed to obtain measurements at appropriate intervals. Temperature/pH and DO/conductivity sensors will be installed in-line along the sampling tubing during collection of bulk effluent).

3. Set up/install tubing to allow a rapid connection to the sampling unit. The pump intake will be placed 1 to 2 inches above the bottom of the chamber in an area of turbulent flow (were complete mixing occurs) to allow the collection of representative samples.

4. Install/hook up appropriate electrical controls for semi-automated operation of the sampling unit. Test equipment/sensors for proper operation and ready equipment for bulk effluent collection of overflow event.

5. Mobilize the sampling unit (prior to anticipated overflow) to the CSO and park it at a location in accordance with appropriate transportation/police department permits. Establish required traffic control. Coordinate with local police department, as required.

6. Secure sampling unit and manhole for semi-automated operation and initiate modem system for notification of sampling. Coordinate periodic security/maintenance checks on sampling unit.

7. Upon notification of overflow by the modem system, return to the CSO during overflow or at completion of overflow. Determine if a sufficient bulk effluent volume has been collected. If a sufficient bulk effluent volume has been collected, demobilize

sampling unit. If a sufficient bulk effluent volume has not been collected, notify the project manager to determine the appropriate course of action.

The remaining tasks (8 through 10) assume collection of a sufficient bulk effluent volume.

8. Transport the bulk effluent storage tank(s) to the sample processing area for sample collection as outlined in SOPs Nos. 4 and 5.

9. Decontaminate sampling equipment as appropriate. Prepare unit for next sampling deployment.

The following additional preparation tasks will be implemented at CSOs where traffic/parking is an issue for set up of the sampling trailer:

1. Obtain required permits from the local police, transportation, and sewerage/sanitation departments for roadcutting, installation of piping, and traffic control.

2. Coordinate roadcutting, pipe/wiring installation, backfill, and road resurfacing from CSO to the proposed mobile sampling unit location.

3. Mobilize sampling unit to location and follow the protocols outlined above.

4. Upon demobilization, piping is to remain beneath the road, unless the local municipality deems it necessary to remove.

6.2 MANUAL BULK EFFLUENT COLLECTION PROCEDURES

These alternative manual collection procedures may be utilized if the semi-automated methodology is not feasible at a given CSO, or if there is pump or other system failure of the semi-automated unit.

1. Pre-install flow meter, temperature/pH, depth, dissolved oxygen (DO)/conductivity/salinity sensors at appropriate locations within the CSO (sensors should be programmed to obtain measurements at appropriate intervals) and intake tubing. The pump intake will be placed 1 to 2 inches above the bottom of the chamber in an area of turbulent flow (were complete mixing occurs) to allow the collection of representative samples.

2. Monitor local weather conditions and, upon prediction of significant precipitation which would likely cause overflow, mobilize appropriate personnel and equipment to the CSO.

3. Observe flow conditions. If overflow is occurring or likely to occur, continue with the following procedures. If overflow is not occurring and is likely not to occur, notify the field project manager to determine the appropriate course of action.

4. Initiate sample collection with the first flush and continue to sample until a sufficient bulk effluent volume has been collected or the overflow event is over.

5. Initiate flow and depth measurement at the first indication of overflow. Measure and record this information at appropriate intervals during sample collection.

6. Measure and record temperature, DO, conductivity, and pH in the discharging water from the CSO pipe. These measurements can be made directly from the pipe or a grab sample. Measurements will be made at appropriate time intervals.

7. Transport the bulk effluent storage tank(s) to the sample processing area for sample collection as outlined in SOPs Nos. 4 and 5.

SOP No. 8 – Collection of Solid Samples Via Direct Centrifugation Methodology

Appendix 10

PASSAIC RIVER STUDY AREA
REMEDIAL INVESTIGATION -
COMBINED SEWER OVERFLOW INVESTIGATION
WORK PLAN/FIELD SAMPLING PLAN

STANDARD OPERATING PROCEDURE NO. 8

COLLECTION OF SOLIDS SAMPLES VIA DIRECT CENTRIFUGATION METHODOLOGY

FEBRUARY 2003

TABLE OF CONTENTS

1.0 APPLICABILITY

This SOP defines the methodology to be followed for the collection of solids samples from CSOs within the PRSA via direct centrifugation of CSO effluent. These procedures give descriptions of equipment and field procedures necessary to do so.

Other SOPs that will be utilized within this procedure include:

- SOP No. 1 – Decontamination;
- SOP No. 2 – Containers, Preservation, Handling, and Tracking of Samples.

2.0 PREPARATION FOR SAMPLING

The RI-CSO WP/FSP (Volume 1) identifies the process for the selection of CSO sampling stations, the frequency of sampling, sample type, and field measurements for this study element. Analytical procedures are discussed in the RI-CSO QAPP (Volumes 2 and 3). The field team is responsible for reviewing the RI-CSO WP/FSP (Volume 1) prior to conducting field activities and ensuring that all field equipment, including sample containers and preservatives, are available and in acceptable condition.

3.0 FIELD EQUIPMENT LIST

Equipment to be used during the collection of solids samples via direct centrifugation of CSO effluent may include, but is not limited to, the following:

- flow meter with electronic depth and velocity sensor, temperature/pH meter, and dissolved oxygen/conductivity/salinity meter;
- modem system for remote monitoring;
- backup temperature/pH meter and dissolved oxygen/conductivity/salinity meter;

- field monitoring equipment (OVA or HNu and CGI/O_2 meter);
- centrifuge;
- peristaltic pump and tubing;
- trailer/semi-automated sampling unit;
- electronic controls for sampling unit;
- electric generator;
- stainless steel bowls and Teflon spatulas;
- traffic control equipment;
- automated precipitation gauge; and
- trailer mounted bulk water storage tank.

All field instrumentation and equipment will be calibrated and maintained in accordance with manufacturer specifications.

4.0 DECONTAMINATION OF EQUIPMENT

Decontamination of CSO sampling equipment will be performed prior to the initial set up and between each sampling event at each location in accordance with procedures outlined in SOP No. 1 - Decontamination. Personnel decontamination procedures are described in the HASP.

5.0 LOCATION OF SAMPLING STATIONS

5.1 CSO LOCATIONS

The RI-CSO WP/FSP (Volume 1) describes the locations of the CSOs within the PRSA targeted for sampling. Once on location, the manhole accessed to collect CSO effluent samples will be established and labeled on a map.

5.2 PRECIPITATION/TIDE MONITORING

Automated monitoring equipment will be used to obtain precipitation data and tide elevation throughout the sampling program. Sufficient precipitation monitoring gauges will be used to obtain an acceptable density of precipitation data for the study area. Precipitation information from government sources will also be obtained during the sampling program. In addition, two tide gauges will be placed within the PRSA. One gauge will be placed in the upper 3 miles of the PRSA, and another placed in the lower 3 miles. These tide gauges will be installed and maintained in accordance with SOP 9 – Tide Gauge Installation and Maintenance.

Field instrumentation and equipment will be calibrated and maintained in accordance with manufacturer specifications.

6.0 DIRECT CENTRIFUGATION

Based on the current knowledge of the CSO system (obtained via the CSO Trial-Run Program [CLH, 2000a]), the following procedures will be implemented, as practicable, for collecting solids via direct centrifugation of CSO effluent from operable and accessible CSOs that discharge into the PRSA. For the RI-CSO Investigation, solids will be obtained from CSOs using a semi-automated collection methodology (Section 6.1). Alternatively, manual direct centrifugation procedures (Section 6.2) may be used.

6.1 SEMI-AUTOMATED SOLIDS COLLECTION PROCEDURES

Direct centrifugation procedures will utilize a mobile sampling unit to collect solids from CSO effluent. This unit will include a heavy-duty enclosed trailer as a secure platform for mounting/housing the sampling equipment/controls. Within the enclosed trailer, electronic controls, storage tank, pump(s), a centrifuge, and appropriate tubing will be mounted/installed. A modem system may also be installed for remote notification of the overflow event. The sampling unit power source will be located outside the enclosed trailer in a secured compartment.

The centrifuge will be able to recover sufficient solids mass from CSO effluent delivered to the centrifuge at a rate of 5 to 10 gallons per minute (gpm). The centrifuge will be operated and maintained in accordance with manufacturer's specifications.

At locations where traffic conditions hinder the positioning of the trailer directly adjacent to the manhole, attempts to install underground piping from an adjacent parking location to the manhole will be undertaken. As appropriate, all necessary permits will be obtained from the local police, transportation, and sewerage/sanitation departments prior to sampling, accessing CSO manholes, or installing underground piping.

Traffic control may be needed to facilitate collection of bulk solids. If the CSO location is heavily trafficked, a traffic control crew may be necessary. A local contractor experienced in traffic control may be retained to perform traffic control in accordance with New Jersey Department of Transportation regulations. The contractor would prepare a traffic control plan outlining notification procedures, crew training, and traffic control measures to be used in this work. PVSC traffic control protocols will be reviewed and incorporated, as appropriate.

At locations where traffic conditions/parking are not of concern, the sampling trailer will be placed directly adjacent to the manhole accessing the CSO. The following protocols will be implemented at CSOs where traffic/parking is not an issue:

1. Properly decontaminate all sampling equipment to be used under this protocol, in accordance with SOP No. 1 – Decontamination.

2. Pre-install flow meter(s) with velocity/depth sensor(s) at an appropriate location(s) within the CSO. (Sensors will be programmed to obtain measurements at appropriate

intervals. Temperature/pH and DO/conductivity sensors will be installed in-line along the sampling tubing during the direct centrifugation process.)

3. Set up/install intake and return tubing to allow a rapid connection to the pump(s) and centrifuge. The pump intake will be placed 1 to 2 inches above the bottom of the chamber in an area of turbulent flow (were complete mixing occurs) to allow the collection of representative samples. The centrifuge return line will drain back into the CSO chamber via return tubing.

4. Install/hook up appropriate electrical controls for semi-automated operation of the pump(s) and centrifuge. Test equipment/sensors for proper operation and ready equipment for direct centrifugation of CSO effluent.

5. Mobilize the sampling unit (prior to anticipated overflow) to the CSO and park it at a location in accordance with appropriate transportation/police department permits. Establish required traffic control. Coordinate with local police department, as required.

6. Secure sampling unit and manhole for semi-automated operation and initiate modem system for notification of sampling. Coordinate periodic security/maintenance checks on sampling unit.

7. Upon notification that overflow has started, return to the CSO during overflow or at completion of overflow.

8. Verify proper operation of the centrifuge, pump(s), and other field equipment.

9. Collect necessary CSO effluent aqueous sub-samples through sampling port of the intake tubing throughout the duration of the sampling event. Aqueous sub samples will be composited and sent for laboratory analysis. Frequency of aqueous sub sample

collection, volume, and analyte list to be submitted for laboratory analysis will be finalized pending completion of the initial evaluation phase.

10. Continue to centrifuge for a minimum of 3 hours and a maximum of 6 hours, or until the overflow event is over.

11. At the end of the sampling event, follow manufacturer's procedure to remove the centrifuge bowl from its housing to recover the solids.

12. Open the bowl and verify that the amount of solids recovery is adequate. Secure solids in centrifuge bowl for transportation to the processing area.

13. If a sufficient solids mass appears to have been collected, demobilize sampling unit. If sufficient solids mass has not been collected, notify the project manager to determine the appropriate course of action.

The remaining tasks (14 through 17) assume collection of sufficient solids mass.

14. Transport sampling unit to the sample processing area.

15. Homogenize the solids in a stainless steel bowl using Teflon spatulas until sediment appears uniform in color and texture.

16. Distribute the homogenized sediment to appropriate sample containers including quality control sample (QC sample) containers (Section 8.0) and label according to SOP No. 2 – Containers, Preservation, Handling, and Tracking of Samples.

17. Decontaminate sampling equipment as appropriate. Prepare unit for next sampling deployment.

The following additional preparation tasks will be implemented at CSOs where traffic/parking is an issue for set up of the sampling trailer:

1. Obtain required permits from the local police, transportation, and sewerage/sanitation departments for roadcutting, installation of piping, and traffic control.

2. Coordinate roadcutting, pipe/wiring installation, backfill, and road resurfacing from CSO to the proposed mobile sampling unit location.

3. Mobilize sampling unit to location and follow the protocols outlined above.

4. Upon demobilization, piping is to remain beneath the road, unless the local municipality deems it necessary to remove.

6.2 MANUAL SOLIDS COLLECTION PROCEDURES

These alternative manual collection procedures may be utilized if the semi-automated methodology is not feasible at a given CSO, or if there is pump or other system failure of the semi-automated unit.

1. Pre-install flow meter, temperature/pH, depth, and dissolved oxygen (DO)/conductivity/salinity sensors at appropriate locations within the CSO (sensors should be programmed to obtain measurements at appropriate intervals) and intake and return tubing. The pump intake will be placed 1 to 2 inches above the bottom of the chamber in an area of turbulent flow (were complete mixing occurs) to allow the collection of representative samples.

2. Monitor local weather conditions and, upon prediction of significant precipitation that would likely cause overflow, mobilize appropriate personnel and equipment to the CSO.

3. Install/hook up appropriate electrical controls for manual operation of the pump(s) and centrifuge. Test equipment/sensors for proper operation and ready equipment for direct centrifugation of CSO effluent.

4. Observe flow conditions. If overflow is occurring or likely to occur, continue with the following procedures. If overflow is not occurring and is likely not to occur, notify the field project manager to determine the appropriate course of action.

5. Initiate sample collection with the first flush.

6. Initiate flow and depth measurement at the first indication of overflow. Measure and record this information at appropriate intervals during sample collection.

7. Measure and record temperature, DO, conductivity, and pH in the discharging water from the CSO pipe. These measurements can be made directly from the pipe or a grab sample. Measurements will be made at appropriate time intervals.

8. Collect necessary CSO effluent aqueous sub-samples through sampling port of the intake tubing throughout the duration of the sampling event. Aqueous sub samples will be composited and sent for laboratory analysis. Frequency of aqueous sub sample collection, volume, and analyte list to be submitted for laboratory analysis will be finalized pending completion of the initial evaluation phase.

9. Continue to centrifuge for a minimum of 3 hours and a maximum of 6 hours, or until the overflow event is over.

10. At the end of the sampling event, follow manufacturer's procedure to remove the centrifuge bowl from its housing to recover the solids.

11. Open the bowl and verify that the amount of solids recovery is adequate. Secure solids in centrifuge bowl for transportation to the sample processing area.

12. If a sufficient solids mass appears to have been collected, demobilize sampling unit. If sufficient solids mass has not been collected, notify the project manager to determine the appropriate course of action.

7.0 SEDIMENT SAMPLE PROCESSING

Sample processing will begin immediately once the sampling unit arrives at the sample processing location after direct centrifugation. The contents of the centrifuge bowl will be homogenized and split using the procedure below.

1. Label the appropriate sample containers with the pre-printed sample identification labels.

2. Open centrifuge bowl chamber using the procedures provided by the manufacturer.

3. Photograph the solids in the bowl.

4. Homogenize the solids in a stainless steel bowl using Teflon spatulas until solids appear uniform in color and texture.

5. Transfer the collected solids to the appropriately labeled containers. Close and seal each container.

6. Check the label on each container and cover the label with clear plastic tape.

7. Label, pack, and ship samples according to SOP No. 2 – Containers, Preservation, Handling, and Tracking of Samples.

8. Ship samples within 24 hours of collection to the appropriate laboratory(ies).

9. Decontaminate sampling equipment as appropriate. Prepare unit for next sampling deployment.

8.0 FIELD QUALITY CONTROL SAMPLES

To identify potential sources of sample contamination and evaluate potential error introduced by sample collection and handling, field quality control samples (QC samples) will be collected during the CSO sample collection. QC samples for CSO sampling will include rinsate samples, field duplicate samples, and matrix spike samples. QC samples will be collected at the frequency identified in the RI-CSO Investigation, Volumes 2 and 3, QAPP.

QC samples will be labeled in accordance with SOP No. 2 – Containers, Preservation, Handling, and Tracking of Samples, and sent to the laboratory with the other samples or analysis.

SOP No. 9 – Tide Gauge Installation and Maintenance

Appendix 11

PASSAIC RIVER STUDY AREA
REMEDIAL INVESTIGATION -
COMBINED SEWER OVERFLOW INVESTIGATION
WORK PLAN/FIELD SAMPLING PLAN

STANDARD OPERATING PROCEDURE NO. 9

TIDE GAUGE INSTALLATION AND MAINTENANCE

FEBRUARY 2003

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1.0 APPLICABILITY

This SOP defines the methodology to be followed for the installation and maintenance of tide gauges located along the PRSA. One gauge will be placed in the upper 3 miles of the PRSA, and another in the lower 3 miles. Exact gauge locations will be determined based on a review of potentially suitable sites for gauge installation in these areas. This SOP describes the necessary equipment, field procedures, materials, and documentation procedures necessary to install and maintain tide gauges.

2.0 PROCEDURE FOR STAFF GAUGE INSTALLATION

2.1 LIST OF NECESSARY EQUIPMENT

Equipment to be used during the installation and maintenance of tide gauges may include, but is not limited to, the following:

- location map;
- appropriate equipment and hardware for installing the gauge;
- tide gauge(s);
- appropriate health and safety equipment;
- field logbook; and
- appropriate decontamination equipment.

2.2 PROCEURE

The tide gauges should be secured to a bridge pier, bulkhead, or similar anchoring point so that the gauge cannot be moved laterally or vertically. Installation activities will be documented in the field logbook according to Section 2.3 of this SOP. Following installation, the gauge will be surveyed and tied to the National Geodetic Vertical Datum (NGVD) used for the PRSA.

2.3 DOCUMENTATION

The field documentation requirements for the project staff responsible for the installation of the tide gauge will include recording pertinent observations made during installation. The documentation will be entered in a bound field notebook with consecutively number pages.

Documentation should include, at a minimum:

- the date of gauge installation;
- time of day of gauge installation;
- river station location;
- specifications of gauge (manufacturer, model number, serial number);
- user-selectable settings such as sampling interval, atmospheric correction, etc.);
- installation method;
- unusual conditions;
- decontamination procedures;
- generalized description of installation location and activities;
- brief description of area around the installation location;
- brief description of the weather conditions at the time of installation;
- date and initials of the individual making the entry (noted on each page); and

- vertical datum and control points;
- survey information and calculations.

3.0 MAINTENANCE

Periodic visual inspections will be conducted to identify any vandalism, or other potential obstructions that would affect data collection. The project manager will be notified immediately to determine the appropriate course of action if any obstructions are identified. Visual observations will be recorded in a bound field book.

4.0 DATA RECOVERY

Data will be collected continuously by each tide gauge. Project staff will periodically download data collected by the tide gauge into a laptop computer or similar device as needed. All activities and visual observations will be recorded in a bound field book.

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